

A¹⁴ mild symptoms. Fruit of 'Sweet Bogenville' is large and sweet, firm and attractive. The tree is productive vigorous, with an upright growth habit. --

A "Version with Markings to Show Changes Made" is enclosed.

The above amendments have been made in accordance with the Examiner's comments and suggestions in the Office action.

Applicant cannot at this time, however, provide some of the information which was suggested with respect to description of particular features of the plant. Moreover, while examples may be provided, some of the descriptions would not necessarily be distinctive characteristics of the plant since the distinctive characteristic is resistance to plum pox virus in combination with the high fruit quality required for commercial success. Applicant therefore provides the following remarks and information in response to the Examiner's comments:

A new Declaration specifically for Plant Patent Applications has been prepared and is currently being routed for signatures.

A. The paragraph at page 1, line 20 - page 2, line 11 has been amended to state that an open pollinated seed of 'Bluebyrd' was transformed.

B. The paragraphs on page 3 containing line 20, and page 6, containing line 2, have been amended to incorporate the suggested corrections.

C. Color designations are believed to have been clarified by amendment of paragraphs providing botanical descriptions on pages 6-8.

D. Several terms were identified as unclear or subjective. In response, applicants provide additional measurements (by amendment to botanical description) where possible. Canopy width measurement was the average of N-S and E-W measurements which were nearly equal.

E. Additional flower and fruit colors have been provided where possible (since this information is season-dependent). It should be noted, however, that, while applicants can provide exemplary descriptions from a particular tree, the descriptions may not be

characteristic or distinctive of the plant. For example, flower colors may vary according to the amount of time elapsing from appearance of the bud until the observations are made. Moreover, the distinctive characteristic of the plant is its resistance to plum pox virus infection in combination with high quality fruit. At any rate, applicants have provided as much information as possible as seasonal conditions have permitted. In addition 91B fruit skin color refers specifically to those areas of the fruit covered by natural fruit waxes, and, as such, is accurate. With waxes removed, the color is specified as RHS 103A.

F. With respect to the remainder of the descriptions mentioned in paragraph F. of the Office action, additional information has been provided where possible (specifically, paragraphs on page 4, lines 9-17 and page 7, lines 5-19). In addition, the chilling requirement cannot be determined at the West Virginia location because the plants are in a cold environment much longer than required due to the particular climate of the area. With respect to the additional measurements provided, the numbers provided represent a mean of: petal size - 9 samples, filament length - 15 samples, pedicel length - 8 samples, pistil length - 9 samples and petiole length - 10 samples.

G. With respect to the parentage of the plant in view of the *Plant Cell Reports* reference, the parents disclosed in the reference were identified as 'Stanley' B69158 and B70146 (page 19, lines 1-2, Materials and Methods section). These parents were used in general to develop all transgenic lines. B69158, which was later released as 'Bluebyrd', was the specific source of seed used to produce clone 'C5'.

H. Applicants have changed the name of the plant as suggested. The name has been changed from 'C5' to 'Sweet Bogenville'.

Claim 1 has been rejected under 35 USC § 102(a) as being anticipated by Scorza et al. (hereinafter "Scorza").

Scorza teaches a plum tree 'C5' which is resistant to plum pox virus infection, and clarification as to whether the 'C5' plum in the publication is the same plant as the one described in the specification. Applicants claim a different plant, and the name has been changed in accordance with the Examiner's suggestion in paragraph H. of the Office action and in order to avoid confusion.

While information on the plum pox virus resistance of clone C5 has been published, the variety described in the instant

application has never been available for public use. It has only been released to collaborating researchers under material transfer agreements. Further, when considering the plant as a whole, 'C5' was selected as a specific combination of genes for many complex characteristics such as tree growth, fruit quality and yield, as well as the unique characteristic of plum pox virus resistance derived from a unique genetic transformation event. Production of a tree having the combination of characteristics described has not been achieved previous to the instant claimed tree. In addition, as mentioned on page 4, line 18 - page 5, line 2, the "combination of fruit quality, resistance to PPV, productivity and tree growth" makes the new variety commercially attractive for fruit production. Fruit quality is a critical component of the variety vis-à-vis its utility both as a commercial variety in its own right and as a parent in producing new plum pox virus resistant varieties with significant potential for high fruit quality. Even with the knowledge of the technologies of hybridization and *Agrobacterium tumefaciens*-mediated genetic transformation, the unique combination of natural genes and the unique insertion event of transgenes that produced the tree and its high quality fruits cannot be reproduced. Again, the tree of the instant invention has never

been made available to the public and remains under the control of the inventors and their collaborators under material transfer agreements. It is believed that this statement satisfies the "REQUIREMENT FOR INFORMATION UNDER 37 CFR 1.105" requesting information as to the public availability of the 'C5' plant variety.

It is believed that the amendments and remarks address as many of the issues raised by the Examiner in the Office action as possible at this time. If any issues remain to be addressed, the Examiner is invited to telephone the undersigned at the number below.

Respectfully submitted,

May 16, 2003
Date

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* I hereby certify that this correspondence is being deposited *
* with the United States Postal Service as first class mail in *
* an envelope addressed to: Assistant Commissioner for Patents,*
* Washington, DC 20231, on May 16, 2003 *
* (Date) *
* Scorza et al. *
* (Name of applicant, assignee, or Registered Representative) *
* Janelle S. Bratu 5-16-03 *
* (Signature) (Date) *

Version with Markings to Show Changes Made

The following paragraphs have been amended as indicated.

Page 1, line 1:

PLUM TREE NAMED ['C5'] 'SWEET BOGENVILLE'

Page 1, lines 3-7:

The present invention relates to a new and distinct variety of plum tree (*Prunus domestica* L.) which is named ['C5'] 'Sweet Bogenville', in particular to a plum tree having the plum pox virus (PPV) coat protein gene which imparts a high level of resistance to infection by PPV.

Page 1, line 20 - page 2, line 11:

The new variety was originated *in vitro* by *Agrobacterium tumefaciens*-mediated transformation of open pollinated seed of the 'Bluebyrd' (not patented) plum with the PPV coat protein gene at the Appalachian Fruit Research Station, Agricultural Research Service, U.S. Department of Agriculture in Kearneysville, WV. Transformation of hypocotyl slices from [a] an open pollinated seed of 'Bluebyrd' was carried out, and transgenic plants containing the PPV coat protein gene were successfully generated

from the hypocotyl slices. In addition to the PPV coat protein gene, the plants also contained genes for kanamycin resistance (NPTII) and β -glucuronidase (GUS), transformation selection markers. The transformation and regeneration process is described in detail in Scorza et al. (1994. *Plant Cell Reports*. vol. 14, pp. 18-22).

Page 3, lines 1-11:

While the female (seed) parent of ['C5'] 'Sweet Bogenville' is 'Bluebyrd', the pollen source (male parent) is unknown. The new variety is distinct from its seed parent by its fruit quality, earlier ripening date (about 1 week earlier) and by the presence of the PPV coat protein, NPTII and GUS transgenes and by its high level of resistance to PPV. Since, at the time of the invention, no other plum tree contained these genes either singly or jointly, the pollen parent could not have contributed any of them, thus the new variety is also distinct from its pollen parent. Plum pox virus resistance is described in Ravelonandro et al. (1997. *Plant Disease*. vol. 81, pp. 1231-1235).

Page 3, line 20 - page 4, line 8:

The new variety [is vegetatively] was asexually propagated

(originally from the greenhouse-grown plant) by bud-grafting on to standard rootstocks, including but not limited to *Prunus persica* (GF305 peach), *Prunus domestica* (European plum seedlings), *Prunus myrobalan* and [*Prunus cerasifera* x *P. munsoniana*] (GF 8-1). Comparisons of [vegetatively] asexually propagated trees and the original plant of the new variety have shown that the characteristics of high level of PPV resistance, vigorous growth, upright tree form, productivity, high fruit quality and large fruit size are maintained. No aberrant types appeared.

Page 4, lines 9-17:

The new variety serves as an effective parent for transferring the PPV coat protein gene and resistance to PPV (as described in Scorza et al. 1998. *Acta Hort.* vol. 472, pp. 421-427 and Ravelonandro et al. 1998. *Acta Hort.* vol. 478, pp. 67-71). The transgene insert is transferred as a single genetic locus and resistance acts in a dominant manner. This simply inherited dominant resistance provides resistance as described above to the major known serotypes of PPV (Ravelonandro et al. 2001. *Acta Hort.* vol. 550, pp. 431-435). The plant is not self-fertile; a pollinator is required.

Page 5, lines 15-18:

Figure 1 is a color photograph showing fruit and leaves of the new plum variety ['C5'] 'Sweet Bogenville' at maturity.

Figure 2 is a color photograph of the tree of the new plum variety ['C5'] 'Sweet Bogenville'.

Page 5, line 21 - page 6, line 6:

The following is a detailed description of the botanical and pomological characteristics of the subject plum. Color data are presented in Royal Horticultural Society (RHS) [Color] Colour Chart designations. Where dimensions, sizes, color, and other characteristics are given, it is to be understood that such characteristics are approximations of averages set forth as accurately as practicable.

Page 6, lines 10-16:

Tree:

Size. - Large; height 4.9 m, canopy width 2.7 m at 7 yr growth in the field.

Vigor. - Vigorous.

Growth. - Upright.

Density. - Medium dense to dense.

Productivity. - Productive.

Bearing. - Regular.

Page 6, lines 17-19:

Trunk:

Size. - Moderate to large, diameter 16.5 cm at 15-20 cm above ground level; circumference 51.3 cm at 15-20 cm above ground level.

Color. - Grayed-green ranging from RHS 197 [A-D] A to D.

Page 6, line 20 - page 7, line 4:

Branches:

Size. - Medium.

Texture. - Smooth to medium rough.

Spur development. - Moderate.

Color. - Grayed-green ranging from RHS 197 [A-D] A to D.

Shoots from roots (rootsuckers). - [moderate] Moderate to heavy.

Page 7, lines 5-14:

Leaves:

Size. - Average length 92 mm, average width 45 mm.

Texture. - Smooth to somewhat rough.

Thickness. - Medium to thick, average thickness 0.42 mm.

Glands. - Two, small, round; average width 0.44, length 0.52 mm.

Margin. - Dentate.

Form. - Obovate-pointed.

Petiole. - Medium length, medium thickness with average length 11.8 mm, width 1.4 mm, thickness 1.3 mm, color green RHS 137B.

Color. - Upper surface-green RHS 139A; lower surface-green ranging from RHS 137[B-C] B to C.

Page 7, lines 15-19:

Flowers:

Bloom period. - Variable depending on weather, late March to mid-April in the Eastern Panhandle of West Virginia.

Color. - White.

Pollen. - Present.

Filament. - Average length 7.7 mm.

Pedicel. - Average length 8.8 mm.

Pistil. - Average length 10.9 mm.

Petal. - Average size of 6.9 mm x 9.6 mm.

Anther. - RHS 13A.

Sepal. - RHS 143C.

Page 8, lines 9-18:

Flesh:

Ripens. - Evenly.

Texture. - Firm.

Fibers. - Small, few, tender.

Juice. - Moderate at eating-ripe.

Aroma. - Moderate.

Flavor. - Very good.

Eating quality. - Sweet, excellent; brix of ripe fruit

averages 21.5° depending on maturity at harvest.

Color. - Yellow ranging from RHS 6[A-C] A to C.

Page 11, lines 2-13:

ABSTRACT

A new and distinct variety of plum is transgenic and is characterized by the presence of the plum pox virus coat protein gene and genes for kanamycin resistance (NPTII) and β -glucuronidase (GUS). The plum pox virus coat protein transgene imparts a high level of resistance to plum pox virus. In field

tests, ['C5'] 'Sweet Bogenville' has been shown to be immune to transmission of plum pox virus by the natural aphid vectors present at the field test site. When ['C5'] 'Sweet Bogenville' is bud-graft inoculated with plum pox virus, it supports only a very low level of virus and is symptomless or shows only transient, very mild symptoms. Fruit of ['C5'] 'Sweet Bogenville' is large and sweet, firm and attractive. The tree is productive vigorous, with an upright growth habit.